When the path is any other curve whose projection on the v, θ-plane has a horizontal tangent at the zero line, its projection on the s, θ-plane is a curve of two distinct branches that meet the zero line in a cusp. The common slope $ds/d\theta$ of these branches at the point of meeting determines the value, at this point, of the specific heat c with regard to the path.

When the path is any curve whose projection on the v, θ-plane has not a horizontal tangent at the point of meeting the zero line, its projection on the s, θ-plane is a curve tangent to the zero line at the point of meeting. Hence the slope $ds/d\theta$ of the zero line at this point determines the value there of the specific heat c with regard to the path. The isobar and the isometric (the curve of constant volume) through the point are such paths.

III. A Check Formula for the Ambiguous Case in Plane Triangles.

By W. R. Ransom, Tufts College.

In the solution of a triangle for which sides a and b and angle A are given, two values B' and B'' are first obtained for the angle opposite b; then two angles C' and C'' are found, and finally two sides c' and c''. The obvious relation $\frac{1}{2}(c' + c'') = b \cos A$ may be used to discover the presence of an error in either of the two triangles that have been computed. This formula does not appear in any text book with which I am acquainted: has it not been employed by some one?

IV. The "King's Chamber" and the Geometry of the Sphere.

By F. J. Dick, Râja-Yoga College.

That the designers of the Great Pyramid possessed a thorough knowledge of the geometry of the sphere has been recognized by some, although the usual view[1] is confined to the recognition of their knowledge of the value of π. The length of the "King's Chamber" is exactly double the breadth, while its height is exactly half the diagonal of the floor.[2] Thus if the width be called 2, and the length 4, the "cubic diagonal" of the chamber is 5.

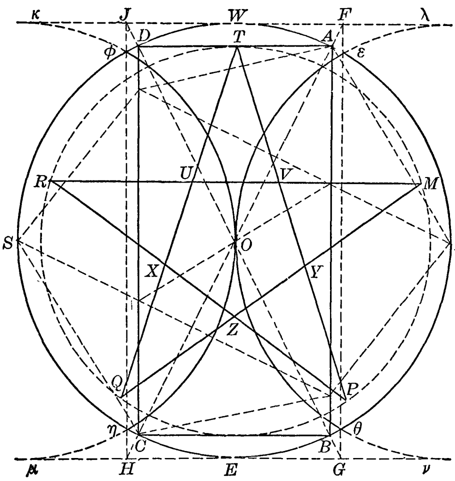
Attention is drawn to the significance of this in connexion with the geometry of the sphere. Let the rectangle $DABC$, 4 units by 2, represent the floor plan (a shape, by the way, found in many ancient temples). Let the circumscribed circle represent the diametral section of a sphere and let two other spheres touch at the center as shown forming the double *vesica piscis* $\phi O\eta S$ and $\epsilon N\theta O$, determining the planes JH and FG cutting the cylindrical envelope $\kappa\lambda\mu\nu$. The diagonals JG and FH coincide with the diagonals of $DABC$, and are each 5 in length, *i.e.*, they are of the length of the cubic diagonal of the "King's Chamber." These are the traces of cones cutting the sphere $WNES$ in the small circles whose diameters are AB, CD. Join AN, and draw the circle $TMPQR$. Then AN measures a side of the pentagon $TMPQR$ whose diagonals only are shown. Pro-

[1] W. M. F. Petrie, *The Pyramids and Temples of Gizeh*, London, 1883.

[2] *Op. cit.*, p. 195.

jecting this and its reflex on AB, CD we have of course the projection of the icosahedron on the plane containing two opposite edges AN, SC, while $UVYZX$ is one face of the internal dodecahedron formed by joining the 12 angular points of the icosahedron.

This diagram appears to show a relation between the *vesica piscis* and the "length-double-the-width" features of some archaic architecture. Incidentally it shows that the inscription of a square in a semicircle places the icosahedron in the sphere at one stroke, so to say.



Taking AN or TM, an edge of the icosahedron, as unity, the edge of the internal dodecahedron is represented by the limit of the sequence

$$\tfrac{1}{2},\ \tfrac{1}{3},\ \tfrac{2}{5},\ \tfrac{3}{8},\ \tfrac{5}{13},\ \tfrac{8}{21},\ \tfrac{13}{34},\ \ldots,$$

the elements of which are formed in obvious fashion from the elements of the series of Fibonacci.[1] This series is found in nature. In certain species of plants, the denominators give the number of shoots or twigs corresponding to a number of spiral circuits given by the numerator.

It seems just possible that the geometers of ancient Egypt who, like the later Pythagorean and Platonic schools, derived their knowledge from ancient Âryâvarta, knew well what they meant when suggesting that the world-universe was built on number and the geometry of the dodecahedron. And it may be that we possess the merest fragments of what was actually taught in the temples of old. But we do have some of their mighty works in stone. Have they been read and fully understood?

RECENT PUBLICATIONS.

REVIEWS.

Euclid in Greek. Book I, with Introduction and Notes. By SIR THOMAS L. HEATH. Cambridge, 1920. Pp. x + 240. Price 10s.

Nearly ten years ago Sir George Greenhill, sitting at his baize-covered work table in Staple Inn, Holborn, in an old-world library well known to many scholars from many lands, made the remark to a visitor from over seas that he felt that the only way to teach plane geometry was by a study of Euclid in the original Greek. The remark led to an interesting discussion upon the present state of

[1] See the article by R. C. Archibald in this MONTHLY for May, 1918, vol. 25, p. 235.